



GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES  
RESOURCES

DEPARTMENT OF PLANNING AND NATURAL

**DIVISION OF ENVIRONMENTAL PROTECTION**

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# **CWA §106(b) GROUNDWATER PROGRAM DRAFT FY 2017 END of YEAR REPORT: 2/26/2018 1.0**

## **Introduction**

Pursuant to Virgin Islands Code Title 12, Chapter 5, Water Resources Conservation Act, § 151 et. seq., groundwater is declared to be "public waters belonging to the people of the United States Virgin Islands, subject to appropriation for beneficial use....". DPNR has been mandated to manage this precious resource.

This End of Year Report follows the format of the EPA-approved FY17 Work plan; with the tasks divided into the following three categories:

- I. Groundwater Program Management.
- II. Wellhead Protection Initiatives.
- III. Interdivisional Technical Assistance.

DPNR-DEP is responsible for the development and enforcement of regulations associated with ground water, the management of databases containing information on wells and well related permits, the mapping of ground water supply well locations, and delineation of wellhead protection areas, other technical activities, and the dissemination of public information. Legal authority for DPNR-DEP primarily rests with the V.I.C., Title 12 (Environmental Protection) - Chapters 5 (Water Resources Conservation), 7 (Water Pollution Control), 17 (Oil Spill Prevention and Pollution Control), 19 (Pesticide Control) and Title 19 (Health), Chapters 51 (Drinking Water), 53 (Sanitation), 55 (Sewage Disposal) and Chapter 56 (Solid and Hazardous Wastes) and the rules and regulations promulgated under these statutes.

The groundwater program currently submits a year-end report to EPA detailing the progress made in completing its work plan. Besides this report there are no other reports submitted to EPA, specifically for the groundwater program. Groundwater monitoring data is often submitted to EPA through other programs, most often by RCRA, UST or CERCLA programs.

## **2.0 Program Management**

### **2.1 VIC amendment**

The objective is to amend the existing Legislation to allow for a sliding permit fee schedule, gravity-based penalty matrix, greater enforcement capability, etc. Technical staff have completed a 'final draft' of the proposed amendments to the Virgin Islands Code Title 12 (12 V.I.C.), Chapter 5. The draft document is currently under legal review. It is our intention to get the legislation adopted by the current administration, during 2018.

### **2.2 Well Abandonment**

The objective is to seal all known inactive/abandoned wells to prevent potential avenues for aquifer contamination. This is an ongoing effort. For every abandoned well discovered, the well owner was directed to either seal the well or apply for a 2-year permit for standby purposes. A permitted but "inactive" standby well must have a cap over the casing (locking is optional) as a precautionary step in lieu of full plugging and sealing.

Please give the citation in the VI Code for the plugging and sealing procedure that DPNR recommends.

Giving the well owner the option of not sealing but having an unlocked cap does not really protect the aquifer from having unwanted waste disposed of in the well. And what is done if an owner is not identified?

### **2.3 National Compilation of the USVI WUDR**

The objective is to create increased compatibility of VIDPNR's water use data with those standards specific to the USGS Water Use and Data and Research (WUDR) Financial Assistance Program. VIDPNR received grant funding from the United States Geological Survey (USGS) Water Use and Data and Research (WUDR) Financial Assistance Program. The objectives of the WUDR grant are to:

- improve the availability, quality, compatibility and delivery of water-use data that is collected and/or estimated by USVI;
- integrate the USVI's water use and availability datasets with appropriate datasets that are developed and/or maintained by the USGS.

An RFP for the 2017 WUDR will be published during the 2<sup>nd</sup> quarter of 2018.

How does DPNR measure actual water use? Is every ground water well, public and private, metered? If so, are meters subject to inspection and calibration?

## 2.4 Climatic Response Groundwater Network in the USVI

The objectives of the network are to monitor changes in groundwater levels, departures from the normal hydrologic condition, and the effect of aquifer withdrawals during below normal precipitation drought periods. The long-term monitoring network is a 50:50 cost-sharing collaborative effort between DPNR and the USGS. The monitoring network was initiated in September 2016, and was completed during July 2017. The network consists of the following:

- ten discrete wells distributed in important aquifer areas to monitor water-quality (see Table 1)
- two continuous groundwater stations at each of the three islands (six stations in total) to monitor groundwater levels, precipitation, and ambient temperature. (see Table 2)

The ten wells were first sampled during the week of July 10-14, 2017. The water quality results for this first round of sampling are summarized in Table 1 below. The full complete results can be viewed at the USGS web page <https://pr.water.usgs.gov>

**TABLE 1: Groundwater Quality for Select Wells**

Site name	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Sodium mg/L	Acid neutralizing capacity mg/L	Chloride mg/L	Fluoride mg/L	Silica mg/L	Sulfate mg/L
WP 20 WELL, ST. CROIX	38	28.4	0.71	322	496	203	0.88	45.4	74.8
STX MUTUAL HOMES 2 WELL, ST. CROIX	112	35.8	1.81	94.5	314	70.8	0.46	28.7	203
PT 2 WELL, ST. CROIX	35.6	9.74	4.11	489	483	392	0.74	24.9	143
SOUTHGATE 3 WELL, ST. CROIX	386	334	2.98	1380	392	3150	1.02	36.7	324
ENIGHED WELL, ST. JOHN	69	61	2.02	393	619	372	1.01	45.6	63.2
EMERALD BEACH WELL, ST. THOMAS	43.4	34.4	2.41	502	645	378	0.91	33.1	94.5
SS WELL, ST. THOMAS	73.2	48.5	2.45	389	659	296	0.88	43.1	80.2

ROLLER COR 1 WELL, ST. JOHN	46.4	61.5	4.58	397	262	570	0.21	38.4	92.9
CINNAMON BC WELL, ST. JOHN	721	583	8.5	672	420	3420	0.48	39.8	287
MAHOGANY RUN 2 WELL, ST. THOMAS	85.5	43.5	1.54	304	493	294	0.84	33.4	107

**TABLE 2: Groundwater Monitoring Network Stations**

Island	Well ID	Begin Date (YY/MM/DD)
St. Croix	WP 14	2017-05-16
	Adventure 28	2016-09-20
St. Thomas	Bordeaux Sheila	2017-04-13
	Grade School 3	2016-05-25
St. John	Coral Bay VIEO 4	2017-04-12
	Sussanaberg DPW 3	2016-09-22

Can any conclusions be drawn from the monitoring data above?

## **2.5 Multi-Year Monitoring Strategy (MYMS) Groundwater Data Gap Project**

Funding for this project in the amount of \$50,000 was provided by EPA through Section 604(b). An RFP was issued during the second quarter of FY17, and the Horsley Witten Group of Sandwich, MA was selected. A contract is expected to be executed during May 2018. This project will satisfy numerous data gaps within the USVI MYMS by allowing DPNR to develop monitoring requirements for groundwater wells. The projected outcomes are as follows:

- to determine areas where saltwater intrusion is occurring;
- estimate the amount of groundwater that should be appropriated in the various aquifers;
- to evaluate how the geological substrate affects water quality and quantity.

## **3.0 Groundwater Program Task I**

The V.I. Rules and Regulations (V.I.R&R.) §151-14. Well construction, part (a) through (f), specify horizontal distances between a well and known pollution sources such as sewer lines (25 feet), septic tank (50 feet), and septic drain field (100 feet), etc. A well location must also be at least 20 feet away from the property boundary, and at least 25 feet from a stream, pond or wetlands.

In addition, pursuant to the V.I.R & R. §654-4, Placement of New UST System, a well must be situated at least 100 feet away from an underground storage tank (UST) system.

At the end of FY 2017 (i.e. Sept 30, 2017), the number of wells in the DPNR Groundwater Site Inventory (GWSI) database is 967. This represents an increase of 22 wells from FY 2016. In summary,

- for St. Croix, appropriation amounts for 18 new wells resulted in a small increase of the total appropriation by 2.9% to 2.16 Million gallons per day;
- for St. Thomas, appropriation amounts for 4 new wells resulted in huge increase of the total appropriation by 36% to 0.5 Million gallons per day;
- for St. John, no change from FY 2016 at 0.1 Million gallons per day.

The well distribution by district is shown in the Table 3 and Figure 1. The groundwater usage by category for FY 2017 is shown in Figure 2.

Not all the wells have been geo-referenced – this is an ongoing effort. For wells that are not yet surveyed, the location of the well can still be mapped using the departmental Global Information System (GIS) based on the associated parcel identification number (PIN); which is a required field in the groundwater permitting relational database. We have purchased two handheld field GPS equipment during FY 2017.

**TABLE 3: Well Distribution by District and Appropriation Amount for FY 2017**

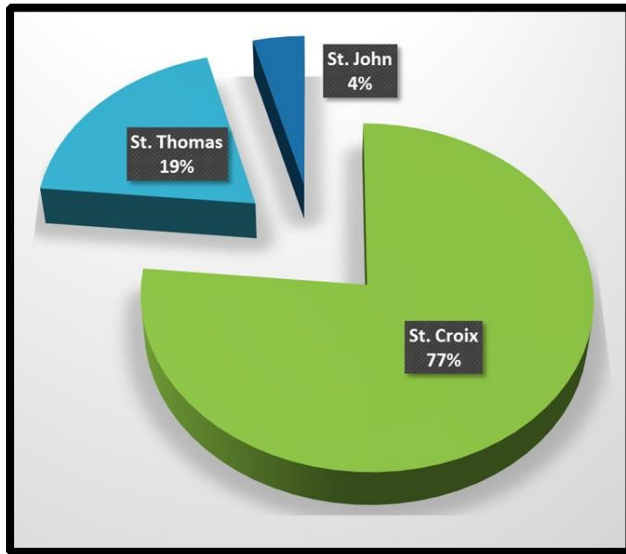
District	FY 16 End of year report	No. of new wells FY 17	FY 17 Total No. of wells	Appropriation FY 16 End of Year report (gpd)	New Appropriation FY17 (gpd)	FY 17 Total Appropriation (gpd)	% increase from FY 2016 to FY 2017
St. Croix*	723	18	741	2,100,000	61,120	2,161,120	<b>2.9</b>
St. Thomas	183	4	187	400,000	143,510	543,510	<b>35.8</b>
St. John	39	0	39	100,000	0	100,000	<b>0</b>
<b>Territorywide</b>	<b>945</b>	<b>22</b>	<b>967</b>	<b>2,600,000</b>	<b>204,630</b>	<b>2,804,630</b>	<b>7.9</b>

gpd = gallons per day

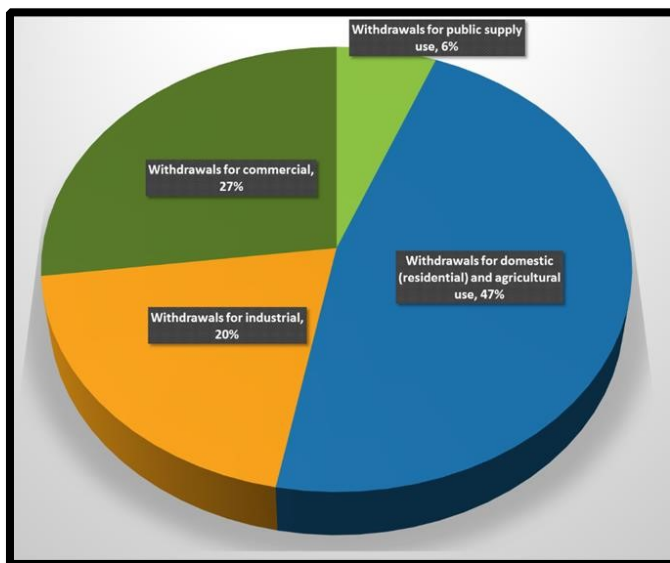
\*Note that this number does not include HOVENSA's groundwater monitoring and product recovery wells.

The ground water program completed 243 site assessments and 75 site inspections during FY17. The ground water program exceeded the EPA-approved target of 64 site assessments and 64 site inspections for FY17. These resulted in the issuance of 46 well drilling permits, 199 soil boring permits, 22 new groundwater appropriation permits, and 63 renewal groundwater appropriation permits.

In addition, a total of 68 Notice of Non-Compliance (NONC) were issued, and a total of 7 Administrative Order (AO) were served. A summary of the number of inspections, assessments, permits and enforcement actions for each month during FY 2017 is provided in Table 4.



**FIGURE 1: Well Distribution by District for FY 2017**



**FIGURE 2: USVI Groundwater Usage by Category for FY 2017**

**TABLE 4: Summary of Groundwater Program Permits issued during FY 2017**

<b>FY17</b>	<b>No. of Site Assessments</b>	<b>No. of Site Inspections</b>	<b>No. of Well Drilling permits (Appendix A)</b>	<b>No. of Soil Boring Permits Appendix A</b>	<b>No. of GW Appropriation Permits - New (Appendix A)</b>	<b>No. of GW Appropriation Permits - Renewal (Appendix A)</b>	<b>No. of NONC Served (Refer to Table 5)</b>	<b>No. of Administrative Order Served (Refer to Table 6)</b>
Oct	9	10	7	3	3	7	14	0
Nov	9	2	0	9	0	2		0
Dec	8	1	1	8	3	0		0
Jan	17	0	2	15	2	0	19	0
Feb	0	4	0	0	0	4		0
Mar	61	6	1	60	2	5		0
Apr	34	2	11	22	6	2	18	0
May	68	6	21	47	2	6		0
Jun	28	10	0	28	0	9		7
Jul	8	26	2	7	3	20	17	0
Aug	1	8	1	0	1	8		0
Sep**	0	0	0	0	0	0		0

<b>TOTAL</b>	<b>243</b>	<b>75</b>	<b>46</b>	<b>199</b>	<b>22</b>	<b>63</b>	<b>68</b>	<b>7</b>
<b>TARGET</b>	<b>64</b>	<b>64</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>60</b>	<b>NS</b>

NONC = Notice of Non-Compliance; NS= Not Specified

<b>ACTIVITY</b>	<b>DUE DATE</b>	<b>STATUS</b>
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It is commendable, from what is described below, that DPNR worked with well applicants and drillers to insure compliance with siting regulations.

### **3.1 Task I-A: Site Assessments**

- Performed site assessments for each well drilling & groundwater appropriation permit application. Each assessment included an identification of potential contamination threats to groundwater quality. Location and construction design criteria were evaluated in accordance to VIR&R § 151.
- Coordinated ground water contamination assessment issues with staff from DPNR's Underground Storage Tank (UST) and Public Water System Supervision (PWSS) programs, and EPA's Superfund and RCRA programs.

The total number of site assessments completed by quarter are shown in Table 4, and are summarized below:

1 <sup>st</sup> Quarter Number of assessments completed: 71	Oct - 9 Nov - 9 Dec -8	No. of Site Assessments completed for FY17: 243 FY17 Target number of Site assessment: 64 <b>Exceeded Target by: 179</b>  These assessments resulted in the issuance of 46 well drilling permits, 199 soil boring permits, and 22 new groundwater appropriation permits. See Tables 4 and Appendix A.  No permit application for well drilling, soil boring and/or groundwater appropriation was denied. The
2 <sup>nd</sup> Quarter Number of assessments completed: 37	Jan - 17 Feb - 0 Mar -61	
3 <sup>rd</sup> Quarter Number of assessments completed: 55	Apr - 34 May - 68 June - 28	



4 <sup>th</sup> Quarter Number of assessments completed: 56	July - 8 Aug - 1 Sep - 0	GW program worked with the applicants and VIlicensed well drillers to ensure that the proposed well drilling locations are acceptable and/or the requested groundwater appropriation amounts are justifiable and available.
<b>Total number of Site Assessments Completed</b>	<b>243</b>	
	<b>DUE DATE</b>	<b>STATUS</b>
<b>3.2 Task I-B: Site Inspections</b>		
Performed site inspections of permitted wells, for compliance with terms and conditions of well drilling/appropriation permits pursuant to VI Rules and Regulations (VIR&R) T.12 Ch.5 §151-8 Terms and Conditions of Permits.		

The total number of site inspections completed by quarter are shown in Table 4, and are summarized below:		
1 <sup>st</sup> Quarter Number of inspections completed: 135	Oct - 10 Nov - 2 Dec - 1	<p>No. of Site Inspections completed for FY17: 75 FY 17 Target number of Site Inspections: 64 <b>Exceeded Target by: 11</b></p> <p>These inspections resulted in the renewal of 63 groundwater appropriation permits. See Table 4 and Appendix A. These existing wells with an expired/lapsed appropriation permits were discovered during:</p> <ol style="list-style-type: none"> <li>1. routine file review, and</li> <li>2. the course of an unrelated inspection, or</li> <li>3. response to citizen complaints.</li> </ol> <p>It is DPNR's policy to assist in voluntary compliance of un-permitted wells. See discussion in Task I-D Enforcement Actions.</p> <p>Note that the majority of the inspections, i.e. approximately 90%, were triggered by routine file reviews, showing lapse in permit coverage. Most facilities comply upon notification; some others require the issuance of a NONC.</p>
2 <sup>nd</sup> Quarter Number of inspections completed: 27	Jan - 0 Feb - 4 Mar - 6	
3 <sup>rd</sup> Quarter Number of inspections completed: 15	Apr- 2 May - 6 June - 10	
4 <sup>th</sup> Quarter Number of inspections completed: 24	July - 26 Aug - 8 Sep - 0	
<b>Total number of Site Inspections Completed</b>	<b>75</b>	

Historically, during previous years, the response rate from the NONC have been very high, at approximately 60-70 %. This has remained the same for FY 2017. The remaining 30-40 % are non-responsive are due to the following:

- a. the wells were never installed by the permittee, but the records were not updated
- b. the wells were no longer in use due to insufficient yield, brackish, water quality or in need of repairs,
- c. the wells have been abandoned and/or sealed, but the records were not updated,
- d. the properties have been sold and new owners are not aware of existence of well or the permitting requirements of an active well.

ACTIVITY	DUE DATE	STATUS
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### **3.3 Task I-C Well Abandonment**

As mentioned earlier, it would be more protective of the aquifer to require *locked* seal on a standby well.

A well is deemed abandoned if it is un-permitted and out of use for more than two (2) years. Based on site assessments and inspections, some wells were ordered shut or abandoned in accordance with VIR&R T.12 Ch.5 §151-23 Plugging of Wells.

1 <sup>st</sup> Quarter	Oct -0 Nov-0 Dec 0	Target number of Well abandonments per quarter:2 Target number of Well abandonments for FY17: 0 <b>Actual number of Well abandonment is 0</b>
2 <sup>nd</sup> Quarter	Jan - 0 Feb - 0 Mar -0	For every abandoned well discovered; the well owner was directed to either a). seal the well or b). permit the well for standby purposes so that it may be reactivated in the future.
3 <sup>rd</sup> Quarter	Apr-0 May - 0 June – 0	All opted for permitting the well because: a. it is the cheapest alternative given that a permit only cost \$10 per 2-year period,

4 <sup>th</sup> Quarter	July - 0 Aug - 0 Sep - 0	<ul style="list-style-type: none"> <li>b. the cost of sealing the well is in excess of \$12,000 per well.</li> <li>c. The high-cost of drilling, in excess of \$60-80 per linear foot – refurbishment of old existing well is far cheaper than drilling a new one.is</li> </ul>
<b>Total Number of Well Abandonment:</b>	<b>0</b>	<p>Most well owners neither have the funds nor the incentive to abandon their wells; estimated to be approximately 100 wells territory wide.</p> <p>The groundwater program has NOT been able to</p> <ul style="list-style-type: none"> <li>a. secure funding for the proper sealing of abandoned and inactive well (i.e. not in use for greater than 2 years) and</li> <li>b. to set up mechanism to recover cost from property owners.</li> </ul> <p><b>RECOMMEND REMOVAL OF THIS TASK FOR FUTURE YEARS.</b></p>
ACTIVITY		STATUS
<b>3.4 <u>Task I-D Enforcement Actions</u></b>		
Target: Issue approximately 2-3 Notice of Violations (NOVs) per month	No NOV was developed	<p>It is recommended that future years work plan target be revised to 2-3 NOV's per year and 1-3 AO's per year, or as needed; to reflect the actual capabilities and competing priorities of DPNR's Legal Program resources.</p> <p>Based on the assessments and inspections of Tasks IA and I-B, enforcement actions were taken at facilities determined to be in non-compliance.</p>
Target: Issue approximately 2-5 Notice of Non Compliance (NONC) order per month	68 NONC were served	
Target: Issue approximately 1-3 Administrative Order (AO) per quarter	7 AOs were served	<p>In addition, certain segments of the regulated community i.e. laundromats were prioritized for file review and noncompliant facilities were issued NONC.</p> <p>As stated in Task I-B above, the response rate from the NONC have been very high, at approximately 60%. It is DPNR's policy to assist in voluntary compliance of</p>

<b>Total Number of Enforcement actions:</b>	<b>68 NONC and 7 AO</b>	un-permitted wells.  See Tables 4, 5 and 6.
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**TABLE 5: List of Notice of Non-Compliance (NONC) served during FY 2017**

<b>1st Qtr (Oct-Dec)</b>
1. William Allen
2. Loretta K. Anderson
3. Alphonso and Valencia Andrews
4. William Armstrong
5. Harris and Maelora Arthurton
6. George C. Ashley Jr.
7. Robert Bartner
8. Rudia Bates
9. Alford Benjamin
10. William Carino
11. Sion Farm Service Station
12. William Duggan & Jean M.
13. Barry Duncan
14. Nadia Farber
<b>2nd Qtr (Jan-Mar)</b>
1. Jose Lima
2. The Nature Conservancy
3. VistaMar Homeowners Assoc.
4. Sion Farm Service Station 3rd.
5. ST. Croix American Youth Soccer
6. Michael Charles
7. Tropical Marine, Inc.
8. Lorraine (Village) Assoc. LLC.

9. Rudy Bates
10. RIX-SKI's INC.
11. SEASHELLS HOLDINGS
12. SCHNELL, DONALD
13. SCHNEIDER, FRED & LORRAINE
14. SANTOS, KAMLA
15. SANTOS, NATANIEL
16. SAMAN VILLAS CONDOMINIUM
17. SOOKRAM, SIEWDATH/Paradise Pure Water Co.
18. COUNTRY WATER
19. Crown Mountain Water
<b>3rd Qtr (Apr-Jun)</b>
1. SAINT JOHN LAND INVESTMENT, LTD.
2. CATHERINE SABIN
3. FREDERICK ROSENBERG
4. ROSS ESTATES INC.
5. ANDREW RUTNIK
6. ALVIN RYMSHA
7. S & 2 VENTURES LAUNDROMAT, INC. (NANTON, LORRAINE)
8. LEE ROHN
9. CALEB E. ROMERO
10. SONIA E. ROSA
11. SEVERANO RODRIGUEZ
12. SAMUEL & SARA RODRIGUEZ
17. Sion Farm Service Station+A58:A63
14. The Village
15. Harbor View Apartments
16. Maxwell Carty
17. Sion Farm Service Station
18. Lorriane Associates, LLC.

4th Qtr (Jul-Sep)
1. ANDERSON, LORETTA K.
2. ANDERSON, RICHARD
3. ANDREWS, ALPHONSO & VALENCIA
4. ANDREWS, BEVERLY
5. ANDREWS, RUPERTHA A.
6. ANWAR MUFID ABED
7. APPLEWHAITE, FRANCES
8. AQUARION SYSTEM, INC. (BRYAN, MARIO)
9. ARMSTRONG, WILLIAM
10. ARRENDELL, VINCENT A.
11. ARTHURTON, HARRIS & MAELORA
12. ASHE, BENJAMIN
13. ASHLEY, GEORGE C. JR.
14. AUGUSTINE, ALFRED
15. BARTNER, ROBERT
16. BATES, RUDI A.
17. BAY ESTATE GROUP, LLLD

**TABLE 6**  
**List of Administrative Order Served During FY 2017**

Action No.	Respondent(s)	Service Date
STX-WRC-001-17 Signed 7/31/17	1. Sion Farm Service Station Abed, Jamal, Jalal, Anuar & Adram	1. 8/4/17
STX-WRC-002-17 Signed 6/26/17	1. Plessen Enterprises 2. Oswald Jackson	1. 7/12/17 2. 6/29/17
STX-WRC-003-17 Signed 7/10/17	1. Estate Carlton Condominiums Owners Assoc.	1. 7/18/17

STX-WRC-004-17 Signed 7/12/17	1. Mohammad Hannun DBA Country Water 2. Wesley Jamison	Pending Respondents off-island
STX-WRC-005-17 Signed 7/10/17	1. Neville Paul DBA LaReine Laundromat	1. 7/19/17
STX-WRC-006-17 Signed 7/12/17	1. Maurice Thomas 2. Barakat Saleh 3. Neville Paul DBA Sunny Isles Laundromat	1. 7/21/17 2. ----- 3. 7/19/17
STX-WRC-007-17 Signed 8/28/17	1. Zenovia De Perez 2. Neville Paul DBA Castle Coakley Laundromat	1. ----- 2. 7/19/17

ACTIVITY	No. of Permits issued	STATUS
<b>3.5 Task I-E Permitting</b>		
Issued well drilling permits as needed.	46	<p>Task I-A site assessments resulted in the issuance of 46 well drilling permits, 199 soil boring permits, and 22 new groundwater appropriation permits. (Note that a monitoring well will not have a corresponding appropriation permit).</p> <p>The 22 new groundwater appropriations totaled approximately 204,630 gallons per day (gpd).</p> <p>Task I-B site inspections resulted in the renewal of 63 groundwater appropriation permits.</p>
Issued soil boring permits as needed.	199	
Issued new appropriation permits as needed.	22	
Issued renewal appropriation permits as needed.	63	

		The 63 renewal appropriations totaled approximately 481,910 gpd.
<b>Total Number of permits issued:</b>	<b>330</b>	

Note that the 204,630 gpd in NEW appropriations, permitted during FY17 represented an approximately 8% increase in total appropriation from FY16 – refer to Table 3.

ACTIVITY	STATUS
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### **3.6 Task I-F Well Driller's License**

The issuance of well driller's license is the responsibility of DPNR pursuant to Virgin Islands Code (VIC)T.12 Ch.5 §157 Well Driller's License. It is a TECHNICAL license, designed to ensure that only qualified drillers can install wells in the Virgin Islands.

A licensed driller is required to submit a well log within 30 days of completion or termination for any reason of the drilling of any well, whether or not water is found. The individual has to demonstrate that he has a business license to conduct a business activity before DPNR can issue a well driller's license. In short, the issuance of a well driller's license does not preclude the individual from obtaining a business license from the Dept. of Licensing and Consumer Affairs. During FY 17, a total of ten drilling companies were licensed in the USVI as listed below.

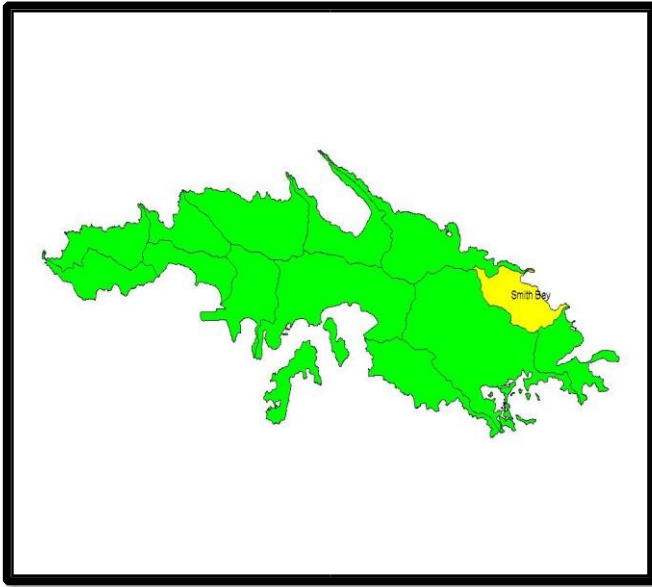
<b>Well Driller Listing 2017</b>	
<b>1. Berg Well Drilling</b> P.O. Box 833, Frederiksted, St. Croix VI 00841  (340) 772-0997	<b>2. Supreme Drilling</b> P.O. Box 1562 Christiansted, St. Croix VI 00821  (340) 277-3541
<b>3. VITEST</b> P.O. Box 154, Christiansted, St. Croix, VI 00820  (340) 514-3500	<b>4. ONSITE Environmental</b> P.O. Box 249, San Juan, P.R. 00646  (787) 278-0563/ (787)-460-4014



<b>5. VI Well Drilling</b> P.O. Box 687 Frederiksted St. Croix, VI 00841  (340 772-1313	<b>6. Jaca &amp; Sierra Testing Laboratories Inc.</b> P.O. Box 363116, San Juan, P.R. 00936-3116  (787) 761-2570
<b>7. GES, Inc.</b> 7&8 Curacao Gade Ste 208, Charlotte Amalie, VI 00802  (340) 690 9972/ G. Doran	<b>8. SGS North America, Inc</b> The Prentice Hall Corporation, Waterfront Center Sta 72 Kron Gade, St. Thomas VI 00802  (609) 294 1110/ (443) 831 6392
<b>9. Geoenvirotech, Inc</b> PMB 347, 405 Esmeralda Street, Suite 2, Guaynabo, PR 00969 (787) 720-6655	<b>10. Lloyd Engineering</b>  72 Kronprindsens Gade, Suite A St. Thomas VI 00802  (832) 426 4656
ACTIVITY	STATUS
<b>3.7 <u>Task I-G Data Management</u></b>  Entered the appropriate data from Task 1-E Permitting (Refer to Table 4 and Appendix A for list of permittees) into the Groundwater Site Inventory (GWSI) database.  Maintained Groundwater Site Inventory (GWSI) database. <ol style="list-style-type: none"> <li>data entry for new well drilling and new appropriation permits as needed.</li> <li>data update for renewal appropriation permits including GPS info and utilize GIS for data analysis as needed.</li> <li>evaluate water budget by watershed for appropriation purposes – work in progress.</li> <li>determine actual number of active wells per watershed; and their corresponding pumping rates – work in progress – see Example 1 for Smith Bay watershed below. This work is ongoing. The examples shown are for illustrative purposes only. The full tabulation of the water budgets (i.e. combined well withdrawal rates vs aquifer</li> </ol>	

Are well logs scanned and stored and readily accessible?

recharge rates for each watershed is expected to be completed by the 2<sup>nd</sup> Qtr of FY 2018. The results will be presented in the FY 2018 EOY Report.



**Example 1: Over pumping of Smith Bay Watershed, St. Thomas.**

**No application for “new” appropriation will be accepted. Existing appropriations subject to review and reduction.**

Size: 862 acres

Recharge rate: 47,000 gpd

No. of wells: 81

Withdrawal: 140,000 gpd

Uses: Commercial water companies, hotels

Mass balance: -93,000 gpd

	STATUS
Are any public water supplies in the Smith Bay Watershed? If so, has reverse osmosis been considered to insure water potability?	

## **3.8 Task I-H Groundwater Monitoring**

### **3.8.1 USGS Climatic Response Groundwater Network**

DPNR has partnered with the US Geological Survey to implement a Climatic Response Groundwater Network in the USVI. **See discussion under Section 2.4**

The groundwater network was completed during 2017 to include:

- Two continuous groundwater stations at each of the three islands (six stations in total) to monitor groundwater levels, precipitation, and ambient temperature, and
- Ten discrete wells distributed in important aquifer areas to monitor water-quality conditions at coastal aquifer areas twice every year.

Visit <http://waterdata.usgs.gov/vi/nwis/current/?type=gw> for additional information.

### **3.8.2 Multi Year Monitoring Strategy (MYMS) Groundwater Data Gap Project**

During FY17, the GW program finalized a Scope of Work, for Section 604(b) funding for the Multi Year Monitoring Strategy (MYMS) Groundwater Data Gap Project. This project will begin in FY18 and is designed to evaluate how the current use of the aquifer has affected the quality and quantity of the remaining groundwater resources. **See discussion under Section 2.5**

A contract is expected to be executed in May 2018, between the VI Govt. and the HorsleyWhitten Group. The project objectives include the following:

1. Assess water budgets for all watersheds delineated up to the 14-digit hydrologic unit codes (HUC). Aquifer recharge rates and groundwater withdrawal rates will be determined by watershed.
2. Determine areas where groundwater has undergone significant degradation in quality and/or quantity due to anthropological factors such as channelization, industrialization, urbanization, etc.
3. Determine areas where groundwater has undergone degradation in quality and/or quantity due to natural causes such as climatic changes, geological factors, etc.
4. Evaluate the groundwater-surface water interaction with respect to aquifer recharge and discharge zones; and wetlands.
5. Provide management framework for the implementation of a territory-wide groundwater monitoring program for inorganic parameters such as salinity/specific conductivity, temp, pH, nitrates, total suspended solids (TSS), total dissolved solids (TDS), etc.

### **3.8.3 DPNR Ongoing Efforts**

Continue the territory-wide groundwater monitoring program for inorganic parameters (Salinity/specific conductivity, temp, pH, nitrates, TSS, TDS, etc.) and water table elevations for facilities that utilize well(s) that's pumping more than 1,000 gallons per day, e.g. public supply wells, industrial and commercial wells.

- Current permit RENEWALS requirements include the submission of the actual pumping meter readings by the permittee (pumping greater than 1,000 gallons per day) to DPNR on an annual basis.
- Requires a public notice and a public hearing for Public Water System and Business Owners that request NEW groundwater appropriation permits in excess of 1,000 gallons per day. This allows stakeholders an opportunity to voice their concerns with regard to the adverse impacts a "new" appropriation may have on their existing wells.

- Citizen letters or phone calls about ground water problems were answered promptly; and assessments or inspections were conducted (see Section 3.1 Task I-A and Section 3.2 Task I-B). See also Section 4.2.2 public awareness and Citizen Complaints.

ACTIVITY	STATUS
<b>3.9 <u>Task I-I Travel</u></b> <ul style="list-style-type: none"> <li>Completed 6 inter-island travel (approximately once every other month), for field work throughout the Territory, including site assessment for suitability of water well installation, water quality, water availability and groundwater contamination issues.</li> <li>No out of territory travel was performed during FY17.</li> </ul>	
ACTIVITY	STATUS
<b>3.10 <u>Task I-J Administrative Reports</u></b> <ul style="list-style-type: none"> <li>Prepared End-of-Year Report for EPA at the end of FY17 fiscal year.</li> <li>Prepared monthly reports on program activities for DEP director.</li> <li>Maintained Groundwater Site Inventory (GWSI) database.</li> </ul>	

## 4.0 Groundwater Program Task II

ACTIVITY	STATUS
<b>4.1 <u>Task II-A Implement Wellhead Protection</u></b>	

<p>Enforce wellhead management standards in designated Water and Power Authority (WAPA) wellhead protection areas on St. Croix. Standards have been developed jointly by DPNR and UVI through funding by USGS.</p>	<p><b>NOT PERFORMED:</b> WAPA wells have been out of service since April 2010. Wells are currently NOT active and there are no plans by WAPA to reactivate these wells since the Desalination plant at Estate Richmond can adequately supply potable water throughout St. Croix.</p> <p>DPNR has been in discussions with WAPA to determine which wells will be permitted for standby purposes and which wells will be sealed permanently. Refer to Tables 1 &amp; 2 below, obtained from the following RCAP'S Inc., studies:</p> <ul style="list-style-type: none"> <li>a. Wellhead Protection Priority Assessment Plan: Phase 1, dated 7/17/10</li> <li>b. Wellhead Protection Implementation Plan: Phase 2, dated 8/04/10</li> <li>c. Wellhead Protection Final Assessment and Recommendation: Phase 3, dated 11/24/10</li> </ul> <p>WAPA has been directed to determine the following:</p> <ul style="list-style-type: none"> <li>1. Wells still under WAPA ownership.</li> <li>2. Wells still under WAPA ownership that will be on standby for emergency purposes i.e. will be permitted.</li> <li>3. Wells still under WAPA that will be abandoned; i.e. will not be permitted.</li> </ul>
	<ul style="list-style-type: none"> <li>4. Wells given to other government agencies e.g. VI Dept. of Agriculture, etc. i.e. will be permitted for use by others.</li> <li>5. Wells returned to land owners - leaseholds lapse; need to ID landowners.</li> </ul> <p><b>To date, WAPA has not provided DPNR with the requested information. It is recommended that this task be removed from future work plans.</b></p>

Prioritize inspections under Task 1-B for wells within WHPA's. Existing permitted wells (specifically pumping rates) will be inspected regularly by DEP to ensure compliance with the terms of the appropriation permit (Title 12 VIC§ 154) and compliance with wellhead management standards.

WHPAs have only been delineated for WAPA well fields (see Table 2 below)

At this time all WAPA wells are out of service since the RO system at Richmond Hill has effectively replaced ground water contributions. A number of these wells and well fields do not belong to WAPA and WAPA has or will allow leaseholds to expire effectively abandoning these wells; site and well owners will become responsible for closure. It was determined in the meeting of 14Jul that all these wells and well fields will be assessed for WHPP compliance.

Table 1. Primary WAPA Wells in Project							
Well#	Well Name	HP	Volts	GPM	Status (see notes)	SWL	Depth
ADVENTURE WELLS							
18	Adventure	1.5	230	7	OK	25.6	88.2
19	Adventure	1.5	230	10	OK	35.6	100.2
20	Adventure	1.5	230	14	OK	33.6	97.6
5	Adventure	1.5	230	25	OK	31.5	103.3
6	Adventure	1.5	230	13	OK	39.3	99.2
8	Adventure	1.5	230	13	N/A	25.7	85.9
FAIRPLAIN WELLS							
9	Bethlehem	2	230	40	OK	38.1	114.2
10	Bethlehem	2	230	40	OK	27.6	121.3
5A	Negro Bay	1.5	230	10	OK	52.7	110.5
5	Negro Bay	1.5	230	25	OK	59.3	114.9
6	Negro Bay	1.5	230	20	OK	65.3	130.1
7	Negro Bay	1.5	230	35	OK	58.6	115.1
6	New Golden Grove	2	230	35	OK	59.3	114.9
7	New Golden Grove	2	230	35	OK	63.3	130.1
8	New Golden Grove	2	230	37	OK	52.7	110.5
15A	New Golden Grove	2	230	40	OK	62.1	122.5
1	Fairplain	0.5	230	10	N/A	27.1	86.7
1	Old Golden Grove	0.75	230	10	OK	29	91.3
15	Old Golden Grove	1.5	230	12	OK	33.5	94.5
16	Old Golden Grove	1.5	230	13	OK	35.7	86.7
21	Old Golden Grove	1.5	230	14	OK	28.7	91.4

N/A – well or appurtenances are dysfunctional or missing; well may not be used

OK – well is ready for service



DPNR developed a map file of the WAPA wells using ArcGIS on 8/4/15. Inspections within WHPA are prioritized.

In addition to the wells and well fields above, the following well fields have been in production or were developed at one time and will be visited and checked for WHPP compliance. Those that have reverted to private hands will be noted and DPNR will schedule dates for closing or rehabilitation, sanitary seal acceptability and security. These fields for Central STX are shown in Figure 2 on page 10.

**Table 2. WAPA Well Fields**

Field Name	Number of Wells/ Wells in Service 2000/ Usable Wells	Will be Used Post-2010	Production (nominal gpm)
Prosperity	2/0/0	No	
La Grange	2/0/0	No (never used)	
Fair Plains*			
Bethlehem	2/2/0	?	80
Negro Bay <sup>1</sup>	4/4/4	Yes	90
New Golden Grove <sup>1</sup>	6/4/4	Yes	147
Old Golden Grove <sup>1</sup>	8/4/4	No	49
Barren Spot*	10/10(?) / 0	No	
Adventure*	9/5/0	No	69
Concordia*	7/5/0	No	

\* - pump station

1 - uses Fair Plains PS

**ACTIVITY**

**STATUS**

## **4.2 Task II-B WHP Education & Public Awareness**

### **4.2.1 WHP education**

The GW program disseminated public information on WHP Protection at the following annual events:

#### **1. St. Croix Agricultural Fair**

February 17, 2017 - February 20, 2017; With agriculture-themed competitions and activities for kids of all ages, the St. Croix 2017 Annual Agriculture and Food Fair encouraged local youth to not only learn how to grow their own food but also to consider becoming farmers as their profession. Looking toward the next generation, the theme of the fair is "Agriculture: Our Heritage and Hope for the Future."

#### **2. Earth Day Eco Fair – S. Croix**

The 24th Annual Earth Day EcoFair was held for 5th and 6th graders on 4/21/17 at the St. George Botanical Garden, St. Croix. The theme is Environmental and Climate Literacy. The purpose of the EcoFair is to teach basic environmental science concepts through active, hands-on activities. The groundwater program participated and offered hands-on activities and/or interactive presentations. About 520 students from various schools attended.

### **4.2.2 Public awareness and Citizen complaints**

Post Irma Maria	Obstacles	Plans moving forward
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<p>Hurricanes Irma (9/4/17) and Maria (9/22/17)</p> <p>Respond to numerous citizen complaints regarding drainage issues and flooding due to groundwater discharges on St. Croix.</p> <ol style="list-style-type: none"> <li>1. CHRISTIAN, AVRIL V 2P LaGrange</li> <li>2. GREENE, MATSON 84 Tipperary</li> <li>3. WILLIAMS, LINCOLN &amp; INA 48-C Whim</li> <li>4. TORRES PEREIRA, FELIX 25 of 2 Carlton</li> <li>5. HARTMAN, LONNIE L. SHARLA R. 25 Carlton</li> <li>6. MALDONADO, DAVID 71 Hannah's Rest</li> <li>7. WASHINGTON, GEORGE 1 Stoney Ground</li> </ol>	<p><u>Natural phenomenon:</u> An "act of god".</p> <p>The groundwater was observed to bubble out of the ground and/or wells at some locations. Groundwater is recharged by the heavy rains associated with Hurricane Maria. Natural springs are caused by shallow water table conditions.</p> <p><u>Education and awareness:</u> Difficult to explain to the complainants that wells are not the cause of the springs – rather the groundwater is following a path of least resistance to the surface, creating an artesian well i.e. flowing well.</p> <p><u>Limited accessibility:</u> Some areas that suffered major damage due to the ponding, such as sinking roads and swamp-like conditions are not easily reached.</p> <p><u>Health concerns:</u> <u>Vectors &amp; odors.</u> Breeding of mosquitoes, and stench of dead vegetation and failing septic systems, etc.</p>	<p>Need interagency coordination between DPNR, DPW and Health.</p> <p>Improve surface drainage at the known location of natural springs.</p> <p>Sanitary seal of wells in flood prone areas, and in waterlogged areas. Identification of failing onsite waste disposal system drain field areas.</p> <p>Public outreach and education.</p>
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Repairs to the DPNR/USGS Climatic Response Groundwater Network in the USVI.	<u>Vandalism:</u> Minimal storm damage but sustained heavy damage due to vandalism after the hurricane. Equipment such as solar panels, transducers, etc., had to be replaced at several locations.	Need to improve fencing and security i.e. locks on gate, around these wells.  DPNR to renew annual cooperative Joint Funding agreement with USGS, to continue collecting and processing water quality data for the sixteen network wells; and provide access to all results of the water quality analysis at <a href="http://pr.water.usgs.gov/">http://pr.water.usgs.gov/</a> .
1. Continuous Groundwater Level Monitoring Network (6 wells territory-wide).		
2. Groundwater Quality Sampling Network (10 wells territory-wide).		
<p>A formal outreach program has <b>not</b> been implemented due to manpower shortages, however, information on record at DPNR DEP are available for review and discussion.</p> <p>In addition <a href="http://www.dpnr.vi.gov">www.dpnr.vi.gov</a>. Application forms are available on DPNR's website.</p>		

## 5.0 TASK III Interdivisional Technical Assistance

ACTIVITY	STATUS
<b>5.1 Task III-A: DPNR Inter-Agency Coordination</b> Provide technical assistance to other DPNR divisions, such as Comprehensive and Coastal Zone Planning (CCZP) and Coastal Zone Management (CZM) for land subdivision and land use rezoning applications, by reviewing such applications for WHPA and other hydro-geological concerns such as storm water drainage, surface water and groundwater hydrology, septic tank suitability, flood plain concerns, etc.	
<b>5.1.1 <u>Underground Storage Tank (UST) program</u></b>	

Perform well search within 1,000 feet of proposed UST sites and review closure reports at leaking underground storage tank (LUST) sites	<p>COMPLETED: Reviewed four proposed UST sites:</p> <ol style="list-style-type: none"> <li>1. 46A Rem, Est. Thomas; C1 Building, Inc.</li> <li>2. 4B-4C Estate Sion Farm; Center Island, LLC.</li> <li>3. 41FA Est. Barren Spot, STX – LaReine Cash &amp; Carry.</li> <li>4. 3 Est. Golden Rock; Atta Misbeh.</li> </ol>
Review remedial investigation/remedial action work plans to evaluation the design of remedial systems for cleanup of contaminated soil and groundwater.	<p>ONGOING: Reviewed the progress of the following LUST sites cleanup.</p> <ol style="list-style-type: none"> <li>1. Esso Farmingdale: Currently implementing corrective action plan (CAP) &amp; ongoing quarterly groundwater monitoring.</li> <li>2. Green Cay Marina: Implementation of Remedial Action Plan (RAP) &amp; Ongoing quarterly groundwater monitoring.</li> <li>3. Texaco Pollyberg: Ongoing gw monitoring; DPNR issued NFA denial due to several outstanding issues that must be addressed satisfactorily by AMEC and Puma.</li> <li>4. Puma Veteran's Drive: Ongoing site assessment - site is considered as a LUST site based on the reported soil and groundwater contamination, discovered during tank closure and tank replacement during August through October 2012.</li> <li>5. VI Seaplane /Port Authority: RAWP implementation upon approval of ACOE permit 7/2016.</li> <li>6. Superior Court, STT: Site assessment pursuant to Administrative Order UST-T-02-15 served to VI Superior Court.</li> </ol>
<b>5.1.2 <u>Brownfield's initiative</u></b>	
Review guidance document for the cleanup of Brownfields sites and Phase 1 and 2 site assessment reports.	NOT PERFORMED: Did not receive any request from the Brownfields Program for technical support
<b>5.1.3 <u>Other Site Assessments</u></b>	

<p><u>Earth change</u>: Review performance standards for conventional and percolation test results for OSDS suitability.</p> <p><u>Comprehensive &amp; Coastal Zone</u> Planning: Hydrogeologic evaluations for subdivision and rezoning applications, wellhead standards.</p>	<p>NOT PERFORMED: Did not receive any request from the Earth Change Program for technical support.</p> <p>NOT PERFORMED: Did not receive any request from the CCZP for technical support.</p>
<p><u>Wetlands</u>: Aquifer recharge and discharge zones and coastal saltwater intrusion. Continue interacting with these various agencies and programs. Evaluate data generated from these various agencies and incorporate information in the overall groundwater management program.</p>	<p>NOT PERFORMED: Did not receive any request from any programs and/or agencies for technical support for Wetlands concerns.</p>

ACTIVITY	STATUS				
<p><b>5.2 Task III-B: DPNR Support for EPA Hovensa RCRA Program</b></p> <p>Hovensa Environmental Response Trust Budget meeting on 6/16/17 and 7/28/17</p>					
<p><b>Reviewed the following Corrective Action and Detection Monitoring Routine Reports</b></p> <table> <tr> <th>DATE</th><th>ACTIVITY</th></tr> <tr> <td>06-Jan-17</td><td>RCRA detection monitoring program Results; Groups 1,2 and 3 Second Semiannual 2016 Sampling Event – Detection Monitoring Program</td></tr> </table>		DATE	ACTIVITY	06-Jan-17	RCRA detection monitoring program Results; Groups 1,2 and 3 Second Semiannual 2016 Sampling Event – Detection Monitoring Program
DATE	ACTIVITY				
06-Jan-17	RCRA detection monitoring program Results; Groups 1,2 and 3 Second Semiannual 2016 Sampling Event – Detection Monitoring Program				

	23-Mar-17	Factsheet South Shore Industrial Complex – Coastal Marine Environment Baseline Assessment, St. Croix, USVI	
	31-Mar-17	Annual submittal of upper aquifer Groundwater Contour Maps for RCRA Units	
	06-Jun-17	May 2017 Data report for the South Shore Industrial Complex – Coastal Marine Environment Baseline Assessment, St. Croix, USVI	
	06-Jun-17	Hovensa asbestos landfill - deed notice	
	20-Jun-17	RCRA detection monitoring program Results; Groups 1,2 and 3 First Semiannual 2017 Sampling Event – Detection Monitoring Program	
	15-Aug-17	Corrective Action Status Report	
	25-Aug-17	Issued twenty-seven (27) soil boring permits and twenty (20) monitoring well drilling permits according to the plan submitted by HOVENSA Environmental Response Trust, entitled “Well Drilling and Soil Boring Workplan”, dated May 12, 2017	
	08-Sep-17	RCRA detection monitoring program Results; Landfarm 1 First Semiannual 2017 Sampling Event – Detection Monitoring Program	

ACTIVITY	STATUS
<b>5.3 Task III-C: DPNR Oversight of ALCOA (Group A)/Lockheed Martin Marietta (Group B) Red Mud Site consent decrees</b>	
<b>5.3.1 <u>Red Mud Group A Major Corrective Activities</u></b>	<ol style="list-style-type: none"> <li>1. 7/13/2017 Comments on the Periodic inspection report no. 3 – Group A MMIP</li> <li>2. 10/3/2016 Approval of As Built Implementation Report (ABIR)</li> </ol>



	<ol style="list-style-type: none"> <li>10/3/2016 Reviewed Monitoring/Maintenance/Inspection Plan (MMIP) dated 07/25/16</li> </ol>
<b>5.3.2 <u>Red Mud Group B Major Predesign Activities</u></b>	<ol style="list-style-type: none"> <li>Participated in Quarterly Meetings for Group B Major Corrective Activities with Lockheed Martin, AMEC Foster Wheeler, SCRG and Smith Gardner; on 12/20/2016, 3/29/2017, 6/14/2017.</li> <li>Reviewed Dec 2016 through July 2017 monthly reports by Amec Foster Wheeler E&amp;I, Inc.</li> <li>2/10/2017 Response to S&amp;G draft Hydrologic Modeling Report dated May 19, 2016</li> <li>4/21/2017 Review of Group B PDWP Addendum B-006</li> <li>5/16/2017 Review of Group B PDWP Addendum B-006 Rev 050517</li> </ol>
<b>5.4 Task III-D: Tutu Wellfield Superfund Site</b>	
<b>1.4.1 <u>Operation and Maintenance of the Groundwater Treatment System (GWTS)</u></b>	<ol style="list-style-type: none"> <li>8/29/17: Year 13 Tutu Wellfield Annual Remedial Action Progress Report by Arrowhead.</li> <li>Quarterly Reports by Arrowhead for Y13Q1, Y13Q2, Y13Q3, Y13Q4.</li> <li>Tutu Monthly Operations and Maintenance Report by Arrowhead.</li> </ol> <p>The GWTS sustained some damage due to Hurricane Irma and Maria insert assessment.</p>
<b>5.4.2 <u>EPA Focus Study RI/FS for Operating Unit 2</u></b>	<ol style="list-style-type: none"> <li>Commented on EPA Remedial Investigation (RI) Report for Operating Unit 2 (draft report and final report dated October 2017)</li> <li>Commented on EPA Focused Source Feasibility Study (FS) for Operating Unit 2 (draft report and final report dated February 2018)</li> <li>Reviewed Tutu RI daily Field Report for RI activities by HDR, EPA's contractor, covering period Oct 31, 2016 through March 7, 2017</li> </ol>